There is, therefore, a general need to take these disadvantages associated with resetting issues into consideration in the design and development of resettable drug delivery devices. Such desired drug delivery devices would tend to reduce the number of component parts and also tend to reduce manufacturing costs while also making the device less complex to assemble and manufacture. Such desired devices would also tend to simplify the steps required for a user to reset a dose setting mechanism while also making the device less complex and more compact in size.

SUMMARY

Embodiments provide a driver of a dose setting mechanism.

In one aspect, a driver of a dose setting mechanism is provided, and for a spindle of a resettable drug delivery device, wherein the drug delivery device comprises the dose setting mechanism and a cartridge holder, said driver comprising: a first component part; anda second component part operatively coupled to said first component part, such that during dose setting of a dose of said drug delivery device and during injection of said dose, both said first and said second component part rotate together, and wherein during resetting of said drug delivery device so as to prepare said drug delivery device for a new cartridge, said first component is decoupled from said second component and is free to rotate while said second component is prevented from rotating, wherein, during the resetting, the dose setting mechanism is disconnected from the cartridge holder.

In another aspect, a resettable dose setting mechanism for use with a drug delivery device is provided, wherein the drug delivery device comprises a cartridge holder releasably coupled to said dose setting mechanism, said dose setting mechanism comprising: a housing; a rotating sleeve in rotatable engagement with respect to said housing; a driver having a first component and a second component, said first and said second component being operatively coupled together; and a spindle operatively coupled to said driver, such that when a user sets a dose by rotating said rotating sleeve, both said first component and said second component of said driver rotate together; and such that during resetting of said dose setting mechanism so as to prepare the dose setting mechanism for a new cartridge, said first component of said driver is decoupled from said second component of said driver and said first component can rotate back to an original position, wherein, during the

resetting of said dose setting mechanism, said cartridge holder is disconnected from said dose setting mechanism.

In one embodiment a driver (e.g. drive sleeve) for driving a spindle of a drug delivery device comprising a first component part (or portion) and a second component part (or portion) rotationally coupled to said first component part. During resetting of the drug delivery device, the first component is rotationally decoupled from the second component. In other words a driver for driving a spindle of a drug delivery device, comprises a first component part; and a second component part operatively coupled to the first component part. During a dose setting of the drug delivery device, both the first and the second component part rotate together. In addition, during reselling of the drug delivery device, the first component is decoupled from the second component and is free to rotate while the second component is prevented from rotating. The first component part may be a unitary molded component.

According to an embodiment the driver further comprises a spindle, wherein during resetting of said drug delivery device, said spindle is reset to an initial position. Preferably, during said resetting of said drug delivery device, said spindle is reset to said initial position by moving said spindle in an axial direction. This movement may be an axial displacement or a combination of an axial displacement with a rotation, i.e. a movement on a helical path.

Decoupling of said first and second components of the driver may be achieved by moving said first component in an axial direction. According to an embodiment said first component is decoupled from said second component by moving said first component in an axial direction away from said second component. Alternatively, said first component may be decoupled from said second component by moving said first component in an axially direction towards said second component.
When the device is used to inject a set dose of medication, both said first component and said second component rotate and/or move in an axial direction. Preferably, the driver (including both said first component and said second component) does not rotate but rather moves in an axial direction towards a distal end of said drug delivery device to thereby drive said spindle in said axial direction when said drug delivery device is used to inject said set dose of medication.

In another arrangement, a resettable dose setting mechanism for use with a drug delivery device comprises an outer housing and a rotating sleeve in rotatable engagement with respect to the outer housing. A driver having a first component and a second component, said first and said second component being operatively coupled together. A spindle is operatively coupled to the drive sleeve. When a user sets a dose by rotating the rotating sleeve, both the first and second component of the driver rotate together. When the user resets the dose setting mechanism, the first component is decoupled from the second component and the first component can rotate back to a starting position.

The dose setting mechanism may further comprise a cartridge holder releasably coupled to said dose setting mechanism, e.g. by way of a bayonet coupling. The cartridge holder may comprise a removable cartridge e.g. containing a medicament.

Irrespective of the above features, embodiments relates to a drive mechanism suitable for an injection device, comprising a housing and a pusher being movable relative to the housing with the pusher being coupled to the housing via first and second coupling means. The first coupling means comprise first engagement means of the housing and the pusher, respectively, cooperating with each other. Further, the

second coupling means comprise a drive member, which is coupled to the pusher, and a dosing element, which is coupled to the drive member, with the dosing element being coupled to the housing via second engagement means. In addition, the drive mechanism provides for a third coupling means comprising a limiting element being coupled to the housing and having third engagement means for coupling the limiting element to the drive member. According to the invention the second coupling means is arranged to be decoupled at a position between the second engagement means and the third second engagement means.

These as well as other advantages of various embodiments will become apparent to those of ordinary skill in the art by reading the following detailed description, with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments are described herein with reference to the drawings, in which:

Figure 1 illustrates an example of a resettable drug delivery device;

Figure 2 illustrates a further view of the first embodiment of the drug delivery device illustrated in Figure 1;

Figure 3 illustrates a sectional view of the first embodiment of the drug delivery device of

Figure 2 in a first position;

Figure 4 illustrates a sectional view of the first embodiment of the drug delivery device of

Figure 2 in a second position;

Figure 5 illustrates a sectional view of the first embodiment of the drug delivery device of Figure 2 in a third position;

CLAIMS

1. A driver of a dose setting mechanism and for driving a spindle of a resettable drug delivery device, wherein the drug delivery device comprises the dose setting mechanism and a cartridge holder, said driver comprising:
a first component part; and

a second component part operatively coupled to said first component part, such that during dose setting of a dose of said drug delivery device and during injection of said dose, both said first and said second component part rotate together, and

wherein during resetting of said drug delivery device so as to prepare said drug delivery device for a new cartridge, said first component is decoupled from said second component and is free to rotate while said second component is prevented from rotating, wherein, during the resetting, the dose setting mechanism is disconnected from the cartridge holder.

2. The driver of claim 1 further comprising a dose limiter wherein during resetting of said drug delivery device, said dose limiter is reset to an initial position.

3. The driver of claim 1 further comprising a spindle, wherein during resetting of said drug delivery device, said spindle is reset to an initial position.

4. The driver of claim 3 wherein during said resetting of said drug delivery device, said spindle is reset to said initial position by moving said spindle in an axial direction.

5. The driver of claim 1 wherein first component part is a unitary molded component.

6. The invention of claim 1 wherein during resetting of said drug delivery device, said first component is decoupled from said second component by moving said first component in an axial direction.

7. The driver of claim 6 wherein during resetting of said drug delivery device, said first component is decoupled from said second component by moving said first component in an axial direction away from said second component.

8. The driver of claim 6 wherein during resetting of said drug delivery device, said first component is decoupled from said second component by moving said first component in an axially direction towards said second component.

9. The driver of claim 1 wherein when said drug delivery device is used to set a dose of medication, both said first component and said second component rotate together at a same rate.

10. The driver of claim 1 wherein when said device is used to inject a set dose of medication, both said first component and said second component move in an axial direction.

11. The driver of claim 1 wherein when said device is used to inject a set dose of medication, both said first component and said second component rotate.

12. The driver of claim 1 wherein when said drug delivery device is used to inject said set dose of medication, both said first component and said second component do not rotate but rather move in an axial direction towards a distal end of said drug delivery device to thereby drive said spindle in said axial direction.

13. The driver of claim 1 wherein when said drug delivery device is used to inject said set dose of medication, said spindle translates.

14. A resettable dose setting mechanism for use with a drug delivery device, wherein the drug delivery device comprises a cartridge holder releasably coupled to said dose setting mechanism, said dose setting mechanism comprising:
a housing;

a rotating sleeve in rotatable engagement with respect to said housing;

a driver having a first component and a second component, said first and said second component being operatively coupled together; and

a spindle operatively coupled to said driver,

such that when a user sets a dose by rotating said rotating sleeve, both said first component and said second component of said driver rotate together; and

such that during resetting of said dose setting mechanism so as to prepare the dose setting mechanism for a new cartridge, said first component of said driver is decoupled from said second component of said driver and said first component can rotate back to an original position, wherein, during the resetting of said dose setting mechanism, said cartridge holder is disconnected from said dose setting mechanism.

15. The resettable dose setting mechanism of claim 14 wherein when said user resets said dose setting mechanism and said first component rotates back to said original position, a dose limiting device returns to an initial position.

16. The resettable dose setting mechanism of claim 14, wherein said cartridge holder is releasably coupled to said dose setting mechanism by way of a bayonet coupling.

17. The resettable dose setting mechanism of claim 14, wherein said cartridge holder comprises a removable cartridge.

18. The resettable dose setting mechanism of claim 17 wherein said removable cartridge contains a medicament.

19. The resettable dose setting mechanism of claim 14 wherein said housing comprises an outer housing.